**8.5 A Atoms/key to fundamental questions**

**Student Expectation**

The student is expected to describe the structure of atoms, including the masses, electrical charges, and locations of protons and neutrons in the nucleus and electrons in the electron cloud.

**Fundamental Questions**

* What is an atom?

The smallest piece of an element that retains the characteristics of the element.

* What are the subatomic particles that compose an atom?

The subatomic particles are protons, electrons, and neutrons.

* How are protons and neutrons similar?

Protons and neutrons are both located in the nucleus and contribute to the mass of an atom.

* What determines the mass of an atom?

The number of protons and neutrons

* How do electrons differ from protons and neutrons?

Electrons are located outside of the atom and contain significantly less mass, they do not contribute to the overall mass of an atom, but they do contribute to the volume of an atom.

* What are the charges of electrons, protons and neutrons?

Electrons are negative, protons are positive, and neutrons are neutral (no charge).

* How do the number of protons and electrons in an atom affect its electrical charge?

When the number of protons (positively charged) equals the number of electrons (negatively charged), the atom contains no charge because the charges are balanced. When the number of protons exceeds the number of electrons, the atom is positively charged (+). When the number of electrons exceeds the number of protons, the atom is negatively charged (-).